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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

JAN 31 1964

IN REPLY REFER TO: AI

COM-2

MEMORANDUM FOR Dr. Nicholas E. Golovin
Office of Science and Technology

Mr. Charles E. Johnson
National Security Council

Mr. Robert F. Packard
Department of State, SCI

Colonal Marshall E. Sanders
Office, Secretary of Defense, ISA

Dr. Edward C. Welsh, Executive Secretary
National Aeronautics and Space Council

Dr. Albert Wheelon, Chief, Office of Scientific Information, Central Intelligence Agency

The attached is forwarded to your office. It represents the final document signed by Mr. Webb and forwarded to the President following coordination with the interested agencies. No substantive change has been made in the advance draft forwarded to you earlier. Language has been simplified and abbreviated.

In addition to copies of the letter to the President, you will find attached several copies of pages to be inserted in your copies of the report itself.

NASA(s) review(s) completed.

Arnold W. Frutkin
Assistant Administrator
for International Programs

Enclosures:

3 copies of letter to the
President with report

4 page inserts (5 copies each)

CONFIDENTIAL

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICE OF THE ADMINISTRATOR

JAN 31 1964

The President
The White House

Dear Mr. President:

The attached report on possible projects for substantive cooperation with the Soviet Union in the field of outer space is provided to you in accordance with National Security Action Memorandum 271, dated November 12, 1963, and my interim report to you of December 13, 1963. It has been coordinated with the Department of State, the Department of Defense, the Executive Secretary of the Space Council, the Central Intelligence Agency, the Office of the Science Adviser, and White House staff.

Since space technology is closely related to and in some measure interchangeable with technology of military interest, careful examination of the attached report is desirable in connection with further initiative in this field.

1. An appendix to the report reviews the status of agreements already reached between NASA and the Soviet Academy of Sciences for cooperation in three areas: (1) coordinated meteorological satellite program; (2) passive communications satellite experiments with the ECHO II satellite launched this month; and (3) geomagnetic satellite data exchange. The appendix also reviews Soviet rejection of numerous specific offers of space cooperation made in the past by the US. At this writing, the Soviet Academy, while in communication with NASA in regard to the agreements between us, has failed to meet time limits on most agreed action items but has conducted optical observations of the ECHO II satellite as agreed and apparently intends to proceed with communications experiments between the USSR and the Jodrell Bank Observatory. Other tests of Soviet intentions under these agreements will materialize shortly.

2. The report focuses upon possible cooperation in manned and related unmanned lunar programs. (Possibilities for cooperation in other space programs have been and will continue to be advanced in the channel between NASA and the Soviet Academy.)

3. The report recommends these guidelines to govern foreseeable negotiations with the Soviet Union in the space field: substantive rather than propaganda objectives alone; well-defined and comparable obligations for both sides; freedom to take independent action; protection of national and military security interests; opportunity for participation by friendly nations; and open dissemination of scientific results.

4. The report recognizes that cooperation with the Soviet Union must ultimately rest on specific projects. However, the advantages and disadvantages of specific proposals are not absolute. They may vary significantly, depending upon Soviet objectives, techniques, procedures, and schedules relative to ours. Lacking sufficient information of these factors, we remain uncertain of the security and tactical aspects of specific proposals which might be advanced to the Soviets.

5. Accordingly, the report outlines a preferred structured approach calculated to determine a level of confidence in any Soviet response, to gain information on basic elements of the Soviet program, and to merit confidence and support by the public and the Congress.

Briefly, this approach provides for maximum exchange of past results (generally subject to verification from other US sources), proceeds then to sufficient disclosure of the future planning of both sides to identify areas favorable for cooperation, and concludes with the joint definition of specific projects. Examples of specific projects would be put forward in the initial presentation of this approach to lend credibility and substance to it.

6. The report recognizes that the Soviet Union is unlikely to be amenable to such an approach. In that case, it would be possible to proceed directly to specific proposals. Some 15 examples of possible projects are described in the report and evaluated in such terms as our current knowledge of the Soviet program permits.

However, limitations (described in the report) attach to virtually all these proposals. These limitations reflect the general climate of US-Soviet relations and are therefore subject to change--which might bring any of the proposals within the range of realistic negotiation. At present, a change in sentiment appears necessary even for small steps in cooperation; for example, in the exchange of purely scientific data relating to solar radiation and micrometeorites, the Soviet Union has within the past year declined to provide details of instrumentation and calibration required for their understanding. Given a change in sentiment, however, such

exchanges would be useful and some cooperation might be proposed and developed in several areas including those listed below and, in addition, mutual tracking support and the recovery and return of manned capsules after their return to earth.

7. On balance, the most realistic and constructive group of proposals which might be advanced to the Soviet Union, with due regard for the uncertainties and limitations discussed above and detailed in the report, relates to a joint program of unmanned flight projects to support a manned lunar landing. These projects should be linked so far as possible to a step-by-step approach, ranging from exchange of data already obtained to joint planning of future flight missions. They include projects for the determination of:

(a) Micrometeoroid density in space between earth and moon.

(b) The radiation and energetic particle environment between earth and moon.

(c) The character of the lunar surface.

(d) The selection of lunar landing sites.

8. I believe this affords flexibility for positive action, utilizing either a variant of the structured approach (paragraph 5) or, with necessarily greater caution, selected specific proposals without reference to the structured approach (paragraph 7).

9. With regard to the timing and form of further US initiatives toward the Soviet Union, the report recommends the following:

(a) Continuing interest should be expressed through the existing NASA-Soviet Academy channel, in a positive Soviet response to the proposals for cooperation already made by President Kennedy and by you.

(b) No new high-level US initiative is recommended until the Soviet Union has had a further opportunity (possibly three months) to discharge its current obligations under the existing NASA-USSR Academy agreement, or, in the alternative, until the Soviets respond affirmatively to the proposal you have already made in the UN.

(c) If Soviet performance under the existing agreement is unsatisfactory, a high-level initiative on a non-

public basis would seem desirable to prod the Soviet Union to better performance; additional public steps might be considered if this proves unavailing.

(d) If Soviet performance under the existing agreement proves satisfactory, personal initiative by you would still be required to extend this success to cooperation in manned lunar programs. Because the scope of initiative by Soviet Academy representatives seems limited, Mr. Khrushchev's personal interest and support would also seem to be required for any significant extension of joint activity. It is believed that your initiative will be more effective if taken privately in the first instance.

(e) A US initiative should establish our interest in the preferred structured approach described above. If it then becomes feasible to proceed with technical negotiations, the NASA-Soviet Academy channel should continue to be the vehicle used; as in the past, technical proposals to be considered in such negotiations should be made available for prior interdepartmental comment. (It may become appropriate to consider an effort to induce the Soviet Union to make personnel available who are closer to their technical program.)

(f) Agreements reached in technical negotiations should be embodied in memoranda of understanding, explicitly subject to review and confirmation by governments.

(g) To demonstrate the serious intentions of the US with regard to international cooperation in space and to maintain some pressure upon the Soviet Union to follow suit, we should continue to expand our current and successful joint projects with other nations to the degree possible.

This report will be kept under continuing review in NASA in concert with other interested offices and agencies, and we shall keep you advised of our progress with the Soviet Academy under the current agreement between us. I believe we are well prepared to support whatever initiative you determine to be appropriate in light of this report and stand ready to provide such additional information and judgment as you may require.

Respectfully yours,

James E. Webb

James E. Webb
Administrator

Enclosure

US-USSR COOPERATION IN SPACE RESEARCH PROGRAMS

President Kennedy and President Johnson have affirmed and reaffirmed the desirability of exploring further joint efforts with the Soviet Union and other countries in co-operative space activities, including manned lunar programs. (See Appendix I.) In support of these initiatives and in anticipation of possible discussions with the Soviet Union, this report examines technical proposals which might be put forward by the United States, as well as other considerations appropriate to such discussions.

For two reasons, this report concentrates upon possible cooperation in lunar programs: (1) cooperation in lunar programs was the focus of President Kennedy's September 1963 initiative and of President Johnson's confirmation of that initiative and, in particular, of his State-of-the-Union reference to the subject; (2) cooperation in other areas of space research and exploration was covered in the Kennedy-Khrushchev correspondence of February-March 1962 in both specific and general terms, has progressed to the point of firm agreement on three projects, and is the subject of an apparently continuing relationship pursuant to that correspondence and agreement. At issue now is an extension of this relationship to the only major field effectively excluded from it, i.e., manned lunar programs and related unmanned efforts. (A brief review of the current relation-

ship appears in Appendix II.)

This report necessarily assumes that the Soviet Union is engaged to some degree in a program looking toward eventual manned lunar landings. Soviet statements on this point have been ambiguous as to timing and status but clearly positive on balance. If there is not a Soviet program, the Soviet Union will probably confuse the issue for an indefinite period. (In that case, it has been suggested that US pressure for cooperation might even induce the Soviet to undertake manned lunar efforts not now planned. Viewed positively, this could divert Soviet resources from less desirable preoccupations; seen negatively, it could lead the Soviet Union into new technology. We believe that the safest assumption is that the Soviet Union does not exclude a manned lunar program and that no significant danger to us is involved if this assumption is incorrect.)

I.

Guidelines which have been applied in the preparation of this report follow:

(1) The central objective is to bring about continuing cooperation with the Soviet Union, rather than to achieve propaganda gains as such. (In his September 20 speech at the UN, President Kennedy stated, "...we must not put forward proposals merely for propaganda purposes;").

(2) In order to achieve real gains, we should press for

substantive rather than token cooperation.

(3) Cooperation with the Soviet Union should be well defined and the obligations of both sides made clear and comparable. (This will facilitate implementation as well as clarify responsibility in the event of failure and withdrawal.)

(4) In the present state of US-Soviet relations, we should undertake no project or other arrangement which might make us dependent upon Soviet performance, thereby impairing or limiting our independent capability in space.

(5) National security interests and military potential must be fully protected. No exchanges impinging upon security should be considered in the absence of certain, comparable, and verifiable information from the Soviet side.

(6) Opportunity for participation by other countries should be preserved and all results made available to them.

II.

Ultimately, any program of substantive cooperation with the Soviet Union must rest upon positive proposals of specific character. Such specific proposals can be defined almost without limit, and numerous examples of different modes of cooperation with the Soviet Union are provided in this report. However, the advantages and disadvantages of specific proposals are not fixed by the terms of those proposals in an absolute sense. The positive and negative

values to us may vary markedly, depending upon Soviet objectives, techniques, procedures, and schedules relative to ours. It is therefore most desirable that we seek information on these aspects of the Soviet program so that we can evaluate and shape our own proposals effectively and prudently. Lacking such information, we would inevitably remain uncertain in matters of security, tactics, and bona fides.

Accordingly, we should define, and attempt to hold to, an approach to the Soviet Union which is calculated to (1) determine the level of confidence which we can place in the Soviet Union in this subject area, (2) provide information of the basic elements of the Soviet program, and (3) merit the confidence and support of the public and the Congress.

An approach structured to achieve these ends is spelled out in the next section of this report. If such a structured approach is not acceptable in whole or in part to the Soviet Union, the President and the Department of State may, nevertheless, depending upon the circumstances and apparent attitude of the Soviet Union, determine that technical negotiators should proceed to the direct presentation of specific proposals. Such flexibility is desirable--but with clear recognition that different considerations will apply to the same proposals, depending upon whether they are offered with

or without some confidence and knowledge of Soviet plans.

III.

The preferred approach to negotiations with the Soviet Union entails the discharge of outstanding obligations, followed by an escalating series of exchanges which are, in the initial stages, subject to verification. It is thus calculated to build a level of confidence upon which progressively significant cooperative activities may be based.

Since negotiation on manned lunar programs necessarily presages significant new relationships with the Soviet Union, requiring evidences of good faith, the first steps should be directed to clearing the slate as much as possible.

A most desirable first step would be material progress on both sides to implement the existing bilateral (Dryden-Blagonravov) space agreement in which the Soviets remain, at this writing, delinquent (although they have resumed communication).

A second step more directly following upon the US overtures in the UN would be the detailed exchange of data and information of the two countries' manned space programs to date. (This should include past flight, biomedical, and training data and could extend to early spacecraft technology.) The virtues of this step would be that it would represent a clean start, requiring from us little new information yet obliging the Soviet Union to present con-

siderable information not previously made available publicly. Since elements of the USSR contribution at this stage would be subject to verification through independent sources, a practical and useful test of Soviet intentions would be available at the earliest contact, and a first confidence level could be established.

If this step should prove a significant obstacle to further progress, it might, in the interests of flexibility, be downgraded, as it were, and subsumed quite naturally under the third step (below). It should, in any event, be tested since other means of determining the degree of Soviet good faith are not readily apparent. Opportunities for establishing a confidence level for dealing further with the Soviets would be diminished in proportion to de-emphasis of this second step.

The third step would be the exchange of gross descriptions of our respective manned lunar programs. Again, this step would not place an undue burden upon us because of the publicity already given to our own intentions, but it would for the first time require the Soviet Union to describe its conceptual approach to the lunar landing problem. This step appears virtually indispensable for it is hardly possible to proceed intelligently or safely to coordinated, cooperative, or joint effort without some over-view of the proposed Soviet program.

The fourth step would seek, through more precise descriptions of our respective lunar programs, to isolate

elements of conflict or duplication and to discover opportunities for trade-off, complementary procedure, or joint action. Significant security considerations do not arise until this step is reached.

* * *

Examples of cooperative relationships that might develop at various stages of the above procedure follow:

-- Conflict between the two programs could arise, as a crude illustration, through plans to use the same "window" for independent lunar missions on the same radio frequencies. It would be of mutual interest to eliminate any such conflicts.

-- Unnecessary duplication, illustrated by independent but adequate programs for exploration of the lunar surface, would offer opportunities for thinning out or otherwise adjusting our respective programs so as to provide, together, only required information--the exact degree of thinning out depending upon the confidence level established at the time.

-- In other cases, a desirable redundancy of effort might be recognized and specific provisions for data exchange made to increase reliability and confidence.

-- Discovery that both sides planned to apply limited resources to the same facet of a broader problem (e.g., examination of the lunar surface in a relatively narrow region) would permit a reordering of efforts to cover additional facets of the problem on a shared-effort basis, with subsequent exchange of the results.

-- Some trade-offs can be visualized, arising from differentials in schedules and capability in the two programs; e.g., the possibility that the Soviet Union might acquire a sample of the lunar surface before the United States, taken together with our twenty-four hour deep space tracking capability, suggests a trade-off between the two; medical data obtained in the Vostok flights might be traded for radiation or micrometeorite data obtained in our scientific program.

If an improved confidence level is achieved through the modest but meaningful arrangements suggested above, progress toward more advanced, integrated relationships could be made.

IV.

At various steps in the above procedure, specific projects should be put forward as appropriate to lend concrete substance to the negotiations. A relatively detailed description of such projects follows:

(Negative or uncertain values reflected in this description follow from our current lack of knowledge of Soviet plans; a more positive evaluation should be possible in each case if serious intentions on the part of the Soviet Union motivate a sufficient exchange of the necessary background information. A negative assessment of Soviet interest or desire in a given case does not necessarily mean that the proposal should not be put forward; it is intended

solely to reflect realistically the present prospects for a substantive advance of our purpose. These apparent prospects may well change in light of any information forthcoming from the Soviet side relative to their program and interests. Close examination of the comments provided in each case will show that the framing of proposals with positive appeal to both sides requires knowledge of the objectives, modes of attack, and relevant schedules of both sides. The same knowledge is necessary to determine what critical tactical or security advantages may be conferred or lost in a given project. These defects grow in direct proportion to the significance of the proposal contemplated.)

A. Data Exchange

1. On Micrometeoroid Flux -- Both the US and the USSR could profit from a full exchange of information on the temporal and spatial distribution, mass penetration characteristics, and shielding of micrometeorites in earth-to-moon space. The security aspects are minimal, and present indications are that information obtained will not present radical problems of an unexpected nature. However, as recently as June 1963, Soviet scientists, in precisely such an exchange relating to their Mars and our Venus flights, declined to give us instrumentation and programming information necessary for meaningful interpretation of their data. Also, the USSR must be expected to be quite

reluctant to provide data on shielding materials and results.

2. On Radiation and Solar Events -- Both sides seek greater knowledge of radiation and particle fluxes in cislunar space, particularly that associated with solar proton events. Such information is necessary to improve the predictability of proton showers so as to fix manned flight schedules safely and permit the design of optimum shielding. This is likely to be a long-range program requiring constant monitoring and predisposes both sides to welcome an exchange of information. We could advance a proposal to define a project of investigation and exchange on this subject to be carried forward by a joint working group consisting of designated representatives of both sides. There is some question, however, whether the Soviets are yet on a par with us in this work. Also, we anticipate that the USSR will continue reluctant to discuss the detailed interrelationships of data, instrumentation, and programming in adequate depth. Nor could we be sanguine about exchange relating to shielding or other countermeasures.

3. Lunar Surface Characteristics -- Both sides require information on the characteristics of the lunar surface for final design of spacecraft to land on the moon. Whether there is the basis for an exchange relationship depends in part on the relative schedules of the two programs; if the Soviets are ahead of us, as is possible at this early stage, they will have acquired intelligence

of the lunar surface before we do and have little interest in any contribution we can make on this point. On the other hand, if we are on similar schedules and the lunar surface is discovered to have radical characteristics not anticipated, such information could become critical to equipment design and even mission success. It could thus become an important element in the space race itself, with critical tactical and even security value. Either side might well wish to withhold knowledge of this kind.

4. Selection of Lunar Landing Sites -- The same considerations discussed immediately above apply to exchange of information in the survey and selection of lunar landing sites. Assuming a Soviet lunar landing program, both sides are faced with the same gross requirement, and thus there should be in principle a basis for cooperation. However, the actual degree of interest and potential for cooperation would depend in good part upon technical requirements and relative time schedules; if the latter are not close, the leading side could be expected to be relatively disinterested, whereas if they are close, information on a suitable site could become critical in a closely competitive situation.

5. Astronaut Training and Experience -- Each side must be assumed in principle to have interest in the other's astronaut training techniques, flight experience, space medicine results, and spacecraft technology. The US has already been quite open in publishing its material along

these lines, and has not yet had comparable periods in orbit. The Soviet Union must therefore be presumed to have less interest than we. Indeed, a Soviet representative to a very recent International Academy of Astronautics meeting declined to participate in a second conference on manned flight, asserting that there was little new to be expected from the American program in the next year or so. (No additional manned flights can be expected in the US program for upwards of a year.) In sum, it would appear that we cannot offer mutuality for a considerable time in flight results and space medicine. Indeed, we would appear to be leading from weakness if we pushed for exchanges in these fields. Exchanges in the related areas of astronaut training and spacecraft technology would, if they were to be meaningful, impinge upon flight systems, security considerations, and simulator techniques, and must be regarded as most difficult to approach in the initial instance with the Soviet Union.

B. Operational cooperation.

1. Mutual tracking support -- Several modes of cooperation in tracking and data acquisition have been explored from time to time with the Soviet Union: the USSR was offered the support of the Mercury network for any manned flight of their own, with no strings attached (Glennan); it was asked to consider an exchange of tracking stations, each side to place a station in the other country, each to operate its own station (Kennedy); and the USSR itself

suggested cooperation in the tracking of deep space probes (Khrushchev), but later retracted this offer, privately implying security considerations. Despite seeming Soviet disinterest in this area and the fact that lunar missions are conducted at particular times (windows) when both sides may launch missions of their own, it seems probable that both could gain from mutual tracking arrangements. Since windows are a function of launch site and tracking station locations, mission profile and objectives, and payload capabilities, the two sides would probably utilize somewhat different windows. We might then provide twenty-four hour ground coverage (lacked by the USSR) in exchange for greater flexibility afforded by use of their land and ship-based nets.

2. Capsule Recovery (earth) -- Both sides face the possibility of spacecraft returns to earth in areas not planned. Accordingly, they might both have an interest in exchanging the signals and recovery procedures to be utilized in emergency recoveries. Either side could then proceed to the rescue of astronauts in areas under their control. The exchange of such signals could in principle also permit either side, somewhat more readily than now, to interfere with recovery operations by the other. However, this appears a very small risk and one which might very well be taken. Such a project would appear to have few negative aspects, little prospect for wide implementation, but possibly considerable public value.

3. Capsule recovery (space)-- It is possible to frame a proposal that both sides agree upon common docking hardware so as to permit either to "rescue" the spacecraft of the other in distress. In fact, it is not known whether hardware common to the two competing systems would be feasible, but assuming it is, rescue operations of this kind, given current limits to spacecraft maneuverability, would require compatible trajectories and orbits, compatible oxygen supply arrangements, an agreed communications, rendezvous, and docking procedure, common training, and possibly compatible aerodynamic configurations for re-entry purposes. At a minimum, guidance systems, docking hardware, and rendezvous and docking techniques, capabilities and limitations would all appear, at early stages, to be of security concern. A proposal of this sort would, therefore, not be attractive to either side.

4. Lunar logistics -- Following the first manned lunar landings, it would appear possible to define a proposal for sharing logistic support for more ambitious lunar exploration. Such a proposal could be shaped in terms of a division of the logistic responsibilities or a division of responsibility as between logistics and personnel. A proposal of this type would have some appeal if the two sides were on roughly similar schedules and shared ambitious plans for lunar stations or exploration, something not known to be planned in either case. If one were well ahead

of the other or had no current plans for ambitious follow-on lunar projects, it would have relatively little appeal. A proposal of this type would have the disadvantage of subjecting us to reliance on the honorable and competent discharge by the USSR of its responsibilities over a period of years. In any case, the proposal would not appear to promise early realization and should be deferred for subsequent consideration in the course of a progressive and satisfactory development of more immediate projects.

5. Trade-Offs -- Where mutual benefits cannot be established in symmetrical projects, it may be possible to relate dissimilar activities to a single balanced cooperative effort. For example, we could offer the Soviets the support of our twenty-four hour deep space tracking capability (in periods when it is not directed to our own use) in exchange for data (or samples) of the lunar surface, which the Soviets might acquire before the US.

C. Integrated Projects

Substantial integration of major elements of flight configurations is circumscribed by two factors: (1) virtually all major contracts for accomplishment of project APOLLO have already been placed, establishing a heavy and costly commitment in design and development; (2) the placement of responsibility in the Soviet Union for integral elements of our own program would enable the Soviet to obstruct our progress while proceeding

clandestinely on their own. Nevertheless, certain cooperative projects requiring close integration are widely entertained and some comment is appropriate. More important, there may be some integrated effort which is, nevertheless, possible at a relatively early stage; at least one proposal of this type is noted below.

1. USSR booster/US spacecraft -- It has been widely proposed that we suggest to the Soviet Union a manned lunar effort based upon the use of their greater boosting capability and the most advanced spacecraft of the US. The Soviet Union is not now known to possess a booster capable of manned lunar landing and return although they are developing engines which, if clustered, could provide this capability. The US is building such a booster. It is not consistent with the US objective of achieving a leading space capability to delegate the development of an adequate booster to the Soviet Union. A reversal of the proposal would not appear to be in the national interest since it would employ an advanced US capability to place a Soviet spacecraft first on the moon. It would also entail Soviet access to US launching sites and techniques without the possibility of access to USSR sites under comparable circumstances.

The heart of the problem posed by a proposal of this type lies in the very extensive exchange of technology required to integrate the spacecraft of one side with the booster of the other. Such an exchange applies to all

significant characteristics of the booster system in design and performance, including guidance, and requires the launching authority to have full information of the spacecraft system. A continuing and extensive mutual interplay on technical terms is known (through experience in domestic as well as international satellite programs with friendly nations) to be required for spacecraft-booster integration if success and avoidance of recrimination are to be achieved. Extensive access would be required by both sides to the launch site, and, by reason of the unsymmetrical basis for the project, such access would be one-sided. No experience with the Soviet Union in areas with (or, indeed, without) military implications suggests that even a small fraction of the interchange required would be forthcoming from them.

2. Turner proposal -- A Republic Aviation engineer, Thomas Turner, has proposed in Life (October 11, 1963) a cooperative effort to circumvent (some of) the difficulties noted immediately above. According to his proposal, the US would forego the development of a large booster and concentrate simply on placing its lunar excursion module (LEM) in earth orbit. The Soviet Union would at the same time place a very large and powerful spacecraft in earth orbit. The two would rendezvous, then utilize the Soviet's spacecraft propulsion to transfer to a lunar orbit, at which time the LEM would separate and descend to the lunar surface with both a Soviet and an American aboard. It would then

return to lunar orbit, the occupants would transfer to the Soviet spacecraft, abandoning the LEM, and return to earth. According to Turner, the sole requirements are common docking hardware and a communications agreement. The proposal is an ingenious one but implies that neither side would develop the total resources to conduct a manned lunar program by itself. We regard this, at this time and in the present context, as an unacceptable interdependence, prejudicing seriously our ability to proceed with our own program in the event that the Soviets do not live up to their agreement over the extended period of years required to implement it. The US requires a major booster for its own posture and broad national interest. Thus, no real saving would be effected by the Turner proposal. The notion that the necessary lunar orbit docking could be conducted without common training and practice procedures on earth is not tenable. In addition, this raises most of the questions which are specified in item B.(3) above. Our conclusion is that the Turner proposal is neither practicable nor desirable at this stage in US/USSR relationships. It could be held in abeyance until a progressive improvement in the discharge of cooperative obligations by the USSR warrants its consideration at a later date.

3. Interchange of astronauts -- The US could propose a reciprocal arrangement under which astronauts of each side are accepted by the other for extended periods

of training leading to participation in flight missions. It is apparent that such an exchange would entail long-term and extensive access to training facilities and programs, flight hardware and systems, launching sites, and so forth, as well as language preparation; however, reciprocity might be assured through synchronized phasing of the program in both countries. The US would have far more to gain than to lose from such reciprocity in view of the relative secrecy of the Soviet program to date. The prospect is particularly attractive because of its implications for opening up Soviet operations. We are informed, however, that it may be politically premature.

As always in dealing with the Soviet Union, it may be feared that comparable access, information, and training will not be afforded the American astronaut(s) exchanged with the Soviet Union. The concept of synchronized phasing of the training of the two would go a long way to correct this, since the two astronauts would move from one phase to another of the two countries' programs on a par and we could withdraw our man if we were dissatisfied. The prospects of such dissatisfaction must be regarded as rather high, given experience with exchange programs with the Soviets in the past. It may be, therefore, that greater success could be had with this same project if, again, it were developed in the course of a progressively improving relationship with Soviet space authorities. It remains, in any case, one of the more attractive possibilities.

In fact, early instruction of selected astronauts in the Russian language has been suggested to remove at least one obstacle to its realization.

V

Questions of initiative, timing, and procedure for negotiations with the Soviet Union have been considered. (The pertinent background and status of past negotiations with the USSR is briefly summarized in Appendix II.)

1. As contacts continue at the agency (Dryden-Blagonravov) level, we should clearly express our continuing interest in a response from the Soviet Union on the question of extending cooperation to lunar programming and other subjects.

2. No new top-level action (by the President, Secretary of State, or Ambassador) is recommended until--

(a) the Soviet Union is given a further opportunity to evidence the discharge of its obligations under the existing NASA-USSR Academy space agreement, or

(b) the Soviets respond to US initiatives already taken in the UN.

3. After the Soviet Union has had a further opportunity to deliver or default on the existing agreement, a further top level initiative would seem appropriate.

The nature of such a US initiative might be along the following lines:

(a) In the event of continued failure of the Soviet Union to discharge existing obligations in the Dryden-

Blagonravov agreement, a top level US/USSR initiative would seem desirable, privately in the first instance. If Soviet intransigence persists, it may then become appropriate to tax the Soviet Union publicly with their failure in matters of cooperation.

(b) If the prospects for an extension of existing agreements to the manned lunar landing area become promising--either because of performance in the existing agreement or because of a response from the Soviet Union to our UN initiative--a further top level US action should be taken, privately in the first instance. For example, the President may wish to inform Khrushchev that we propose an orderly, structured approach toward a developing cooperation, beginning with the maximum exchange of past results, proceeding to sufficient description of future planning to permit identification of possible areas of cooperation, and concluding with the definition of specific projects. (Examples of possible projects would be included in the presentation of this structured approach to lend it credibility.) Again, if the Soviets are intransigent, consideration might be given to stating our position publicly in order to increase pressure on the Soviet Union. In such a public statement, the US approach could be openly described to domestic and foreign advantage.

4. Whether a further US initiative is taken or a specific Soviet response to the President's UN offer received, in either case making negotiations possible, it is then our considered view that our action should be for the express purpose of preparing the way for technical discussions. The NASA-Soviet Academy channel, which has been successfully opened by Dr. Dryden, should continue to be the vehicle for technical exploration and negotiation of the possibilities for cooperation with the Soviet Union. (If it should prove technically desirable or necessary, consideration should be given to requesting the Soviets to assign to the negotiations personnel closer to the technology of their program.) As in the past, proposals to be considered in such negotiations should be made available for prior inter-departmental consideration.

5. Any agreements reached at this technical level should be embodied in memoranda of understanding, explicitly subject to review and confirmation by governments.

6. As a tactical device, calculated to put pressure upon the Soviet Union, demonstrate our serious intentions, and gain good will from certain nations, consideration should be given to means by which "other countries" than the Soviet Union might be further identified with our lunar programs. (See Appendix III.)

US-USSR COOPERATION IN SPACE RESEARCH PROGRAMS

APPENDIX I

(A) President Kennedy made the following statement regarding United States-Soviet cooperation in outer space in his address before the United Nations General Assembly on September 20, 1963:

"Finally, in a field where the United States and the Soviet Union have a special capacity--the field of space--there is room for new cooperation, for further joint efforts in the regulation and exploration of space. I include among these possibilities a joint expedition to the moon.

Space offers no problem of sovereignty; by resolution of this Assembly, the members of the United Nations have foresworn any claims to territorial rights in outer space or on celestial bodies, and declared that international law and the U. N. charter will apply. Why should the United States and the Soviet Union, in preparing for such expeditions, become involved in immense duplications of research, construction and expenditure? Surely we should explore whether the scientists and astronauts of our two countries --indeed, of all the world--cannot work together in the conquest of space, sending some day in this decade to the moon, not the representatives of a single nation, but the representatives of all humanity."

(B) President Johnson reaffirmed the above statement through Ambassador Adlai E. Stevenson who made the following remarks in Committee I of the United Nations General Assembly during debate on international cooperation on outer space, on December 2, 1963:

> "As you also know, President Kennedy proposed before the General Assembly last September to explore with the Soviet Union opportunities for working together in the conquest of space, including the sending of men to the moon as representatives of all our countries. President Johnson has instructed me to reaffirm that offer today. If giant strides cannot be taken at once, we hope that shorter steps can. We believe there are areas of work--short of integrating the two national programs --from which all could benefit. We should explore the opportunities for practical cooperation, beginning with small steps and hopefully leading to larger ones.
>
> "In any event, our policy of engaging in mutually beneficial and mutually supporting cooperation in outer space--with the Soviet Union as with all nations--does not begin or end with a manned moon landing. There is plenty of work yet to come before that--and there will be even more afterward."

(c) In his State-of-the-Union address to the Congress on January 8, 1964, President Johnson said,"

"Fourth, we must assure our preeminence in the peaceful exploration of outer space, focusing on an expedition to the moon in this decade--in cooperation with other powers if possible, alone if necessary."

APPENDIX II

The background of experience in negotiations with the USSR is briefly summarized: Progress at all levels has almost invariably required US initiative. It appears that new initiatives are successful only if the way is paved at the very highest levels. Negotiations are seriously hampered by the fact that Soviet representatives are drawn from the Academy complex which seems to be once removed from the actual conduct of the Soviet space program. (Soviet scientists do not often appear well informed of flight conditions or hardware.) Soviet reaction time to US initiatives and correspondence has been extremely slow. The USSR is currently delinquent on most action items scheduled in the Dryden-Blagonravov agreements; however, correspondence has been resumed by Blagonravov after more than three months of silence and agreed optical observations of the ECHO II satellite have now been performed by the Soviet Union.

The basic Soviet line for the past four years has been that significant cooperation cannot precede major improvements in the political atmosphere, including disarmament. (The US proposals which led to the Dryden-Blagonravov agreement were apparently regarded as sufficiently modest to permit some departure from this line--though at least one of the agreed projects could lead to a joint global meteorological satellite system.)

At various times the Soviet Union has rejected US offers of tracking support for manned flights, an interchange of overseas tracking stations for earth satellites or deep space probes, formal participation with NASA and other countries in experimental communication satellite tests, exchanges on standards and techniques to preclude contamination of the lunar and Martian environments, and repeated open-end offers to explore any items of interest to the Soviet Union.

With regard to Soviet plans for a manned lunar program, Khrushchev has said little more than that the USSR will not proceed until they are ready and that they are working on the problem, but it is not known whether they are developing a large enough booster although engines suitable for clustering for that purpose are reportedly under development. Khrushchev has spoken only ambiguously about cooperation and has actually seemed to accept competition as desirable.

On the other hand, some softening of the Soviet line may be indicated, not only by the Dryden-Blagonravov agreement, but also by the recent willingness of the Soviet Union to reach agreement on legal principles to apply to space activity and on radio frequencies to be used in space communications and research. The requirements for these agreements, however, are far from comparable to those applicable to cooperation in manned lunar programs.

A brief summary and evaluation of the status and content of the Dryden-Blagonravov agreement follows:

A first US-USSR Bilateral Space Agreement was reached on June 8, 1962 and was then supplemented by an implementing Memorandum of Understanding which became effective August 1, 1963. Together, these agreements set forth the technical details and arrangements for cooperation in three areas:

1. Coordinated Meteorological Satellite Program
   - -- Exchange of cloud cover photographs and weather situation analyses gained from each country's experimental meteorological satellites;
   - -- Establishment of a full-time, conventional, facsimile quality communications link between Washington and Moscow for two-way transmission of these data;
   - -- Coordinated launchings of future experimental weather satellites, and ultimately, of operational weather satellites.
2. Communications Satellite Experiments
   - -- Experimental transmissions at 162 mc/s between the USSR and the Jodrell Bank Observatory in England using the US passive reflector satellite ECHO II;
   - -- USSR to consider experiments at higher frequencies;

-- USSR to consider radar and optical observation of ECHO II;

-- Future negotiations on possible joint experiments with active communications satellites.

3. Geomagnetic Satellite Data

-- Launching by each country of a satellite equipped to measure the earth's magnetic field as part of research planned for the International Year of the Quiet Sun in 1965;

-- Exchange of results of satellite measurements;

-- Exchange of data from magnetic surveys of other types.

Dr. Dryden wrote Blagonravov in mid-August listing action items requiring early completion if the agreed deadlines for joint action were to be met, and conveying the United States position on each. This communication went unanswered until December when Blagonravov acknowledged the letter, apologized for delay, indicated substantive replies were being prepared, and asked for the launch date for ECHO II. Dr. Dryden replied immediately by cable, giving the launch window and nominal orbital elements for the ECHO II satellite, and reiterating NASA's request for Soviet radar cross-section and optical observation of the satellite during the inflation stage (which occurs in part over the USSR on the first orbit).

This cable was immediately acknowledged by Blagonravov; as of this writing, he has provided a statement of intention to discharge at least the minimum requirements upon the Soviet Union for observation of ECHO II and communications tests with that satellite. He remains delinquent in other outstanding matters.

Although all joint action has slipped several months because of Soviet dilatoriness, this need not affect any of the proposed cooperative efforts substantively but may only delay their implementation. At this time, it seems likely that Soviet performance will continue ragged, with little regard for deadlines. The remoteness of the relationship maintained by the USSR detracts in some degree from the positive value of the cooperative association established; nevertheless, satisfactory completion of any of the steps prescribed in the agreements should provide the best basis for improved relationships and further progress.

APPENDIX III

Besides inviting the Soviet Union to cooperate in the lunar program in his recent UN speech, the President expressed a desire to bring other countries in as well. The possibilities include the following:

1. Tracking and data acquisition--We already enjoy the cooperation of a number of countries in the accommodation and operation of manned flight tracking and data acquisition stations and should publicize this fact along with our interest in extending the present level of participation.

2. Scientific experiments--We now give foreign scientists a chance to compete for space for their experiments in our observatory satellites. We should consider extending this practice to Gemini and Apollo, noting that these opportunities may be very limited even for our own scientists. (In addition to space and weight limitations, there could be difficulties growing out of Air Force participation in Gemini).

3. Contracts--If they materialize in sufficient number, publicity can be given to certain subcontracts entered into with foreign contractors (e.g., Canadian companies are developing and providing extensible antennae for the Gemini and Apollo missions, including the antenna to be used for rendezvous missions.) In addition, consideration

could be given to offering foreign governments the opportunity to take on the development and production of subsystems and parts, on a cooperative basis (i.e., at their own expense), to meet our design, standard, and schedule requirements. The technical and contracting limitations would, however, be severe and the takers few.

4. Astronaut orientation--A program might be organized under which foreign high performance pilots might be brought together for observation of, and limited participation in, NASA astronaut training (only) programs as a familiarization and orientation effort on a continuing basis (e.g., successive three-month classes).

5. Astronaut training and flight--The numerous and valid objections heretofore raised against including foreign pilots in our astronaut program are recognized.

The negative aspects are these: rivalry among interested foreign nations; further pressure upon our limited flight opportunities; resentment by current US astronauts; difficulties in application of commercial benefits to astronauts; security questions; pressures for flight priorities; feminist and congressional criticism; absence of practical application abroad for the training given here.

The positive aspects are these: Few other single actions could more dramatically express the President's deep desire for cooperation; few other single actions could equal

the boost given by this one to US relations with Latin America or Asia, if pilots from those regions (many already trained here) were chosen; few other actions could do more in the next few years to eclipse Soviet propaganda in this area--or protect us more effectively against a similar Soviet move.

On balance, technical and political considerations suggest a negative conclusion on an offer of this kind and preference for the proposal reflected in item 4 above.

* * *

Perhaps the most acceptable position to meet the issue of third country participation is represented by the recent statement of Senator Clinton P. Anderson before the AIAA, January 15, 1964:

> "....we can give validity to this nation's policy to internationalize space by asserting that the United States will accept offers of support from any nation which can contribute to the space program."

Such contributions should continue to be organized and implemented within the policies already applicable to existing (and uniformly successful) international programs of NASA.

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TO The President
FROM Jesse E. Webb
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3 Copies w/att
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to Dr. Wheelon
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